

Human life cannot be nurtured, nursed, and sustained unless we nurse and sustain the ecological habitat within the womb of which we all reside.

Henryk Skolimowski, *Eco-Philosophy*, 1981

CONSERVATION

Mountain Tourism: News from Nepal

To honor the 50th anniversary of the first ascent of Sagarmatha (Mount Everest) and the 25th anniversary of the founding of Sagarmatha National Park (SNP), a conference titled People, Park, and Mountain Tourism was held 24–26 May 2003 at Namche Bazaar, Nepal. Fifty-five delegates from 15 countries, including government and tourism officials, environmental consultants, and local stakeholders, trekked the steep, winding mountain trail to Namche Bazaar (elevation 3,450 meters) to present and discuss academic papers on the natural and cultural preservation of remote mountain destinations and the development of mountain tourism.

In preparation for the conference, the planners held an online “e-symposium” to help participants focus and sharpen their ideas before the actual meeting. Moderators posted papers on such topics as the environmental and health hazards created by mountain tourism, the ecologic and economic risks that tourism poses to host communities and neighboring areas, and the role that park managers, development agencies, local authorities, and individuals play in conservation. Stakeholders then posted their own comments and responses

in a virtual discussion of the topics raised. The discussions are available at <http://www.mtnforum.org/apmn/ppmt.htm>.

Most conference presentations focused on environmental issues affecting the SNP, but others addressed issues in India, Japan, New Zealand, and other mountainous countries. Krishna Hari Gautam, a professor at the Graduate School of Environmental Earth Science at Hokkaido University in Japan, stressed the need to boost responsible mountain tourism globally and said that mountaineers could play an important role by acting as role models for tourists. Kazuya Kurita, a professor at the Tokyo University of Agriculture, discussed Japan’s success in revegetating alpine regions of that country that have been heavily impacted by tourism.

In a presentation titled “Garbage along the Mount Everest Trek,” Beau Beza, a lecturer in landscape architecture at the University of Melbourne in Australia, said it is not necessarily the fact that garbage is seen in the landscape that creates a negative perception of environmental care among tourists and Sherpa mountain guides, but rather the way the garbage is managed. Alberto Baroni, an associate professor of environmental medicine and public health at Italy’s University of Padua, discussed a novel approach to monitoring and assessing ecosystem health in mountains that draws upon local knowledge and stewardship as well as integration of successful

tourism development models used in other areas. Pema Gyamtsho, an agriculture resources policy specialist at the International Centre for Integrated Mountain Development in Kathmandu, stressed the important role that livestock plays in maintaining environmental health in hard-to-read high Himalaya regions. He argues that grasslands created through livestock grazing are important for carbon sequestration, nutrient cycling, water capture, and biodiversity conservation.

Dinesh R. Bhujju, an ecologist with the Royal Nepal Academy of Science and Technology in Kathmandu, discussed research at the Pyramid International Laboratory–Observatory in the SNP on human health in extreme conditions. Located at 5,050 meters in the SNP, the Pyramid is the world’s highest scientific laboratory. “Medical science tells us that people can’t [climb beyond] the seven thousand– to eight thousand–meter level without oxygen, but Sherpas do it,” Bhujju said. “The challenge for modern science is to find out why.”

The conference ended with the delegates unanimously endorsing 13 resolutions related to protecting and securing natural resources, conservation planning, and ecosystem monitoring along the trails of the SNP. Specifically, they resolved that management planning within the SNP should strive for an integrated approach toward land, water, wildlife, and human resources, that measures should be taken to reduce firewood consumption in remote mountain areas, and that patrolling and environmental law enforcement within the SNP should be reviewed and significantly upgraded.

Said presenter Alton C. Byers, director of research and education at the Franklin, West Virginia–based Mountain Institute, “The discussions at this conference show that we need to work harder to develop a greater awareness of the issues relating to ecotourism and that those involved in the industry must take greater responsibility for their impact.”

Bruce E. Jefferies, a conservationist with the Bangkok-based consulting company MIDAS Agronomics, said that will be a tough challenge. “Many of the problems are complex, and their solutions won’t happen overnight,” he explained—it’s going to take serious cooperation among everyone involved. Proceedings of the conference will be published on CD-ROM by the United Nations University and in an upcoming special issue of the recently launched *Himalayan Journal of Sciences*. —Ron Chepesiuik



Conquering or corrupting? A recent conference marked the 50th anniversary of the first ascent of Sagarmatha (Mount Everest) and examined the problems caused by mountain tourism in the decades since.

ECONOMICS

Health Hazards and Health Care Costs

The health hazards of environmental pollution have been studied so extensively we almost take them for granted. No one questions the claim that heavy metal and fossil fuel pollutants exact some toll on human health. Air pollution alone is estimated by the Natural Resources Defense Council to cause tens of thousands of premature deaths in the United States each year. Almost as axiomatic-sounding is the assumption that investing in environmental management will lighten the burden on the health care system—and bring down annual spending. Finding ways to meaningfully quantify this relationship is not easy, however, as illustrated by an exploratory study published in the May 2003 issue of the *Journal of Epidemiology and Community Health*.

Canadian researchers from McMaster University and the University of Waterloo used cross-sectional ecological data from 49 regions, counties, and districts of Ontario to calculate the health care burden posed by the local environment. Using measures of environmental quality and protection, and controlling for income, education, and other variables thought to influence health care expenditures, they reported that both toxic pollution and per capita municipal environmental expenditures had significant associations with health care expenditures. Counties with higher pollution levels tended to have higher per capita health care costs, whereas those that spent more on environmental protection ended up spending less on health care.

Two separate comparisons can be considered in assessing just how much of an impact efforts to control ecological degradation might have on health care spending. In comparing the least- to most-polluted regions, the findings suggest that pollution could exert a \$355 difference in per capita health care expenditures for people living in Ontario. Comparing counties that spend the most on environmental protection (which are not necessarily the least-polluted counties) to those that spend the least, pollution could account for a \$200 difference.

“The accuracy of these figures of course depends on data sources and levels of analysis,” says report coauthor John Eyles, a professor at the McMaster School

of Geography and Geology and director of the McMaster Institute of Environment and Health. “We were using data collected by other people for other purposes, so the data quality and availability were not optimal.” The study assumed that mortality, rather than morbidity, was a sufficient measure of the health care burden. Types of pollution and point sources were not considered.

Ecological studies such as this one can reveal only possible associations, not actual causal relationships. Nonetheless, the findings do suggest that counties and states that spend more on environmental protection get a payoff. Still, says Michael Kruse, a researcher with the Washington, D.C.-based Consultants in Epidemiology & Occupational Health, this study doesn’t have the power or specificity to target which parts of the environment would affect health expenditures. “I don’t think the authors are suggesting that every dollar you put into the environment is going to reap major [health care] dividends,” he says. “But clearly it’s correct to say that many factors, including environmental concerns, can influence health care expenditures. If you want to control the costs of health care, it may pay to factor in environmental quality and protection.”

In both the United States and Canada, reform policies aimed at containing health care expenditures have typically focused within the health care system itself. In Canada, for example, these reforms have led to income caps for physicians, among other measures. The cost containment debate now appears to have been too myopic. “Investing for the health of our communities is not simply a matter of investing in conventional medical care facilities,” says Eyles. “These [investments] are vitally important, but significant benefit may be gained from environmental improvements, and over time those improvements may reduce the need for increased health care expenditures.”

Eyles hopes that findings such as these will help reshape public policy in the direction of enhancing social and environmental justice in the United States and elsewhere. If environmental investments can be seen to yield health and social benefits, and if these benefits likely have their largest impact among disadvantaged populations, then such research should support the development of environmental programs specifically designed for those communities in greatest need.

—M. Nathaniel Mead

U.K. Bans Tobacco Ads

The United Kingdom is seeing a progressive ban on tobacco advertising. On 14 February 2003, a ban on most conventional tobacco advertising came into effect. Further bans on tobacco promotions such as coupons and domestic sports sponsorships took effect 30 July 2003, and regulations on point-of-sale advertising should take effect before the end of the year.

Health advocates have warmly supported the initiative. Paul Nurse, chief executive of Cancer Research U.K., said research has shown that “tobacco advertising discourages existing smokers from trying to quit, and it encourages new smokers to take up the habit.” The British Medical Association has called for the government to go one step further and ban smoking in public areas.



Staph Grows Stronger

Infections caused by antibiotic-resistant *Staphylococcus aureus* cost the United States an estimated \$24–36 billion each year. Infections from methicillin-resistant *S. aureus* (MRSA) are linked to higher mortality rates than those caused by methicillin-susceptible strains, and some MRSA strains are becoming resistant to physicians’ treatment of choice, vancomycin. Researchers reported in the November 2002 issue of *Applied and Environmental Microbiology* finding mutant MRSA strains with elevated resistance both to pine oil cleaners (widely used as disinfectants in countries around the world) and to vancomycin and oxacillin. Further tests suggest that the same genetic mutation in cell wall structure and physiology may be responsible for both types of resistance.

Dogged by Allergens

In a study comparing how asthma sufferers are affected by several common allergens, including those from dogs, cats, cockroaches, and grass, researchers with the Asthma Clinical Research Network found that exposure to dog allergens caused the greatest disturbances in pulmonary function measurements in asthma patients. Effects included less air exhalation, more nitric acid released from respiratory tract cells, and more eosinophils in phlegm, said lead author Tim Craig of Penn State University. Nearly all participants (95%) were sensitive



to at least one test allergen, with five the average number of positive tests per patient. Compared to outdoor allergens studied—such as those from trees, weeds, and grass—indoor allergens were associated with more markers of asthma instability. The study was presented at the May 2003 American Thoracic Society International Conference.

POLICY

World Water Forum Diluted

Water has been called “the next oil,” the commodity over which most future wars will be fought. According to the 2003 United Nations *World Water Development Report: Water for People, Water for Life*, the demand for sanitary and potable water is increasing with the world's population. In 2000, according to the report, water-related diseases killed more than 3 million people and affected more than 2 billion, particularly children under age 5. Furthermore, within the next 20 years, the amount of water available per capita worldwide is expected to drop by a third. These and a myriad of other water-related issues were raised at the 3rd World Water Forum, held 16–23 March 2003 in Kyoto, Japan, and attended by 24,000 scientists, activists, and government representatives—who, some say, arrived with radically varying goals in mind.

Kenzo Hiroki, a vice secretary general of the Secretariat of the 3rd World Water Forum, says the planners relied on an open, bottom-up process that accepted virtually any water-related topic, rather than forcing an agenda. The result was an increase to 351 sessions from the 87 at the 2nd World Water Forum, held in 2000. Individual sessions ranged from “Groundwater Governance in Asia” to “Observing Global Rain from Space,” from “Voices of the Grassroots: Women” to “Protecting the Dead Sea.”

Some attendees saw this sweeping scope as a strength, highlighting the importance of water in the international sphere. Others said it was a weakness; many felt the forum was too unfocused and had

too many sessions. Ultimately, says Paul van Hofwegen, a senior water management expert for the World Water Council—an international think tank headquartered in Marseilles, France, and the forum's driving force—because so many stakeholder groups had the opportunity to organize their own sessions, the integration, discussions, and debate among groups that should have taken place did not materialize to the extent the planners hoped for.

Some experts believe that what many countries really face is not

a water crisis but a governance crisis, and that good water governance requires effective and accountable systems imbued with transparent and participatory processes that address both ecological and human needs. Rather than spread itself across all things water, World Water Forums would better serve the public by concentrating on immediate, pressing needs, says Stephen Turner, deputy director of WaterAid, a London-based health organization working in Africa and Asia—and by getting real, binding commitments from the 130 governmental ministers who attend a



The never-ending quest. The recent 3rd World Water Forum strove to find solutions but became mired in disparate goals.

concurrent, although separate, conference.

“The idea of the forum is that . . . the ministers can actually push the agenda and agree to make change,” says World Resources Institute scientist Carmen Revenga. “If there's not going to be any political commitment and real change in the way we manage water to benefit both people and ecosystems, then what is the point of having the forum?” Adds Turner, “I think that perhaps one of our difficulties in the water sector is that we tend to talk [just] to each other.” Perhaps, he says, the meeting shouldn't have been called the 3rd World Water Forum, but rather the 3rd World Education Forum—“because that's where we can build allies.” —**Scott Fields**

PHARMACEUTICALS

Drug Data for a Custom Fit

When it comes to drugs, one size definitely does not fit all. Now a new resource may help researchers individualize medicine. The Pharmacogenetics and Pharmacogenomics Knowledge Base (PharmGKB) is one way that researchers are working toward individualized medicine. PharmGKB is the face of the Pharmacogenetic Research Network, a collaborative group of scientists who study the effect of genes on people's responses to a wide variety of medicines. The network was launched by the National Institute of General Medical Sciences three years ago and now includes members at five other NIH branches and eight universities.

“Pharmacogenetics is all about variation,” says Mayo Foundation pharmacologist Richard M. Weinshilboum. “Our goal is to help predict which patients will have an adverse response to a drug and which patients need higher or lower doses,” he says.

“This will lead to true individualization of therapy.”

Although some researchers use “pharmacogenetics” and “pharmacogenomics” interchangeably, others distinguish pharmacogenetics as the study of how one person responds to a drug, and pharmacogenomics as the use of genomic information to guide new drug development.

PharmGKB is accessible via a free, publicly available website located at <http://www.pharmGKB.org/>. It contains genomic and phenotypic data, and links them all together. The data complement the genome database by offering gene variants and linking these variants to abnormal responses to drugs. Researchers can both search the database and add their own findings.

One of the most exciting submissions to date, says Russ B. Altman, a Stanford associate professor of genetics and medicine who is the principal investigator in charge of the database, is a compilation of two dozen variations in transporter genes involved in the metabolism of medicines, submitted by a team at the University of California, San Francisco (UCSF). Some

of these variants are responsible for differences in transporters that pump environmental toxicants out of intestinal tissue before they can be absorbed. This protects the body against harmful chemicals, but can also produce unintended drug responses, says principal investigator Kathleen M. Giacomini, chair of the UCSF Department of Biopharmaceutical Sciences. For example, super-effective transporters can pump out drugs before they are therapeutically absorbed, whereas nonfunctional transporters offer no defense against environmental insults and may make a person hypersensitive to medicine.

“It's pretty new and exciting for the NIH to run this cross-institutional project,” says Harvard Medical School researcher Scott Weiss, who is zeroing in on a handful of genes that affect an asthma patient's response to inhaled steroids. Researchers within the network who study heart and lung function are now focused on similar genes and are sharing their results, Weiss says. “It has taken us quite a while to get moving, but I think this year will be a big one for the network as a whole.” —**Renée Twombly**

ehpnet

Association of Occupational and Environmental Clinics

Occupational and environmental medicine practitioners must know general medicine, but they also have to be aware of the clinical aspects of toxicology, risk assessment and identification of exposures, epidemiology, molecular biology, pharmacology, and public health. Occupational and environmental physicians are often the first health providers to discover links between environmental exposures and human health effects.

The Association of Occupational and Environmental Clinics (AOEC), a Washington, D.C.-based nonprofit network of more than 60 clinics and 250 individuals, was founded in 1987 with the mission of advancing the practice of occupational and environmental medicine. The AOEC supports collaborative research that develops data on environmental and workplace health hazards and the health effects stemming from exposure to such hazards. The association also facilitates the exchange of information on topics such as the diagnosis and treatment of occupational and environmental diseases among health care professionals and the general public. To promote these efforts and provide an Internet base for their activities, the AOEC has developed a website located at <http://www.aoec.org/>.



Member clinics are located in 29 states, the District of Columbia, and 4 Canadian provinces. The AOEC Clinics page lets visitors search for clinics by state or by university or program name. Clicking on a link opens a page with clinic contact information, lists of the most common diagnoses seen at the clinic, and general services provided. These may include medical surveillance, screenings, and industrial hygiene consulting, and more specialized services such as pulmonary function assessment, skin allergy testing, assessments of indoor mold, and acute and chronic toxicity assessments.

The AOEC Educational Resources page features downloadable PowerPoint presentations on such topics as lead, occupational asthma, and impacts of criteria air pollutants on the respiratory health of children. Workbooks, training manuals, videotapes, and fact sheets are among other resources available from the AOEC library that can be downloaded or requested online.

The Educational Resources page provides information on university curricula and a link to EnviroDX, a multimedia "virtual clinic" developed by Eddy Bresnitz of the Robert Wood Johnson Medical School. Users are presented with four "patients" (whose symptoms may or may not be caused by environmental factors) and information on their exposure history as well as resources for researching the possible effects of suspected toxicants. Users select diagnostic tests, make a final diagnosis, prepare a treatment plan, outline preventive measures, then quiz themselves to check their answers.

Through cooperative agreements with the Agency for Toxic Substances and Disease Registry and the U.S. Environmental Protection Agency, the AOEC has created 12 Pediatric Environmental Health Speciality Units (PEHSUs) throughout North America. These units are collaborations between AOEC university clinics and pediatric clinics at the same institution. They serve as an educational resource for primary care providers and parents. The Pediatric Environmental Health Units page provides portals to each PEHSU's webpage, phone numbers, and links to the sites of other organizations that are of special interest to parents.

The AOEC is working to build an online record of actual occupational and environmental cases with profiles of anonymous patients. The AOEC expects these cases to be used as markers to help select participants for future research trials and to provide interesting cases of unrecognized health effects related to environmental exposures. The AOEC is also working on a database of all possible environmental toxicants that can cause health effects. —Erin E. Dooley

Green Bags: The Proof Is in the Pudding

Each year, U.K. shoppers use more than 10 billion plastic bags. The bags take up valuable landfill space and can clog waterways and storms drains when discarded improperly. In response to threats of a tax on plastic shopping bags similar to one recently instituted in Ireland, U.K. retailers are turning to new biodegradable shopping bags made with tapioca starch.

Sainsbury's, a leading U.K. grocery chain, unveiled its new shopping bags in April 2003. The bags degrade in 20 days when composted, compared to the 60–100 years it takes conventional bags to break down, and 30% of the petrochemicals used in polyethylene are replaced with tapioca. Any starch can be used, but tapioca was chosen because it is plentiful in the Far East, where the bags are made.



G8 Leaders Support the Environment

At a 3 June 2003 meeting in Evian, France, leaders of the world's "Group of Eight" major industrial nations—Canada, France, Germany, Italy, Japan, Russia, the United Kingdom, and the United States—released a joint statement on environmental responsibility and sustainable development. Initiatives to protect marine and coastal areas and efforts to support capacity building in water and sanitation management in Africa were top priorities. The leaders also adopted an action plan on how to best use science and technology to foster sustainable development in three areas: global observation, improved energy sources with resultant reduction of air pollution and climate change, and agriculture/biodiversity. During the talks, Russian leaders reiterated their plans to ratify the Kyoto Protocol this year, which would bring that convention into force.

Indoor Air Innovation

When allowed to grow unchecked indoors, microorganisms such as mold, mildew, and fungi can cause allergic reactions, respiratory problems, and digestive upset, especially in asthma and allergy sufferers. To fight these indoor air villains, Carrier Corporation recently announced it would incorporate Agion™, a silver ion-based antimicrobial coating, in its top-of-the-line air handling unit. Produced by

AK Coatings and registered with the U.S. EPA, Agion works through the slow release of silver, a broad-spectrum microbicide. Although Agion-coated surfaces help ensure healthier indoor air, developers stress that the coatings do not reduce dust; treated units require the same cleaning as conventional air handlers.

